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EUROPEAN PINE SHOOT MOTH SURVEYS
OREGON AND WASHINGTON
1963

by

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INTRODUCTION

Five surveys were made in Oregon and Washington in 1963 for the European pine shoot moth (Rhyacionia buoliana). This moth, a prime insect pest of young pine trees was first observed in the western United States at Bellevue, Washington in 1959. Since this observation, annual surveys have been made in Oregon and Washington to detect spread of the moth from the containment zone and to aid in eradication projects at Portland, Oregon and in the Spokane Valley.

This year a cooperative survey with the Washington State Department of Natural Resources was made in Spokane Valley to determine if the 1961 moth eradication program had been successful. In a like cooperative survey the Oregon Department of Forestry surveyed the Portland Metropolitan area where an eradication program has been in progress since 1961.

U. S. Forest Service crews made three surveys during the year with the largest covering 70 communities in Oregon and Washington outside the containment zone. This containment zone includes the moth-infested area around Puget Sound and suspected infested adjacent areas. All movement of pine stock out of the containment zone has been halted. One of the remaining surveys was made to determine the area infested within the containment zone and the other to determine rate of spread of the moth on Mercer Island. Results of each of the five surveys are presented in the following sections.

PORTLAND ERADICATION SURVEYS

State of Oregon Department of Forestry crews, in cooperation with the U. S. Forest Service, continued a program to eradicate the shoot moth in the Portland Metropolitan area. During 1961 nineteen moth-infested pines were found and destroyed at eight residential properties and all

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pinos were destroyed in three infested commercial nurseries. In 1962 eighteen more infested pines on three properties were found and destroyed. The 1963 survey was concentrated in the areas where infested trees were removed and in other areas with large numbers of ornamental pines.

Six 3-man crews spent 806 man-days examining 98,411 pines for the shoot moth. Ninety-six collections were made of possible moth-infested shoots and six pines on five residential properties were confirmed as being infested. All infested trees were destroyed with the owners' permission.

The Nursery Inspection Service, Oregon State Department of Agriculture, inspected 427 nurseries and 321 retail outlets. In total, 102,217 pines were examined and one infested pine was found in a nursery in south-east Portland. This pine may have been infested by moth flights from a large infested pine located at a residence one-half block from the nursery. All pines present in the nursery during the previous year's moth flight were destroyed.

The general area where the infested pines were located was re-surveyed and no additional infested pines located. It appears that this area is now free of the shoot moth but additional surveys will probably be made during the spring of 1964.

Cost of this survey was \$18,097.78 shared equally by the State of Oregon and the U. S. Forest Service.

SPOKANE VALLEY SHOOT MOTH ERADICATION SURVEY

A European pine shoot moth infestation was found infesting one nursery and one residence in the Spokane Valley during 1960. The following spring a program was started to eradicate the moth in the Valley. Personnel of the Department of Natural Resources, State of Washington, in cooperation with the U. S. Forest Service examined 24,683 pines and found 429 infested by the moth. The infested trees and 294 adjacent pines were removed and destroyed prior to the 1961 moth flight. This area was surveyed again during April and May of 1962 but no infested pines were located.

Plans were made to resurvey the area before the moth flight in 1963. Department of Natural Resources personnel supervised 24 crew men in making this survey. Crew leaders were trained in a moth infested area of Seattle on April 29 by a U. S. Forest Service entomologist.

During May crews spent 370 man-days examining 15,785 pines in the Spokane Valley and adjacent towns. Collections were made from 52 pines infested with insects. When examined by the entomologist, none of these were found to be the European pine shoot moth.

A stand of native ponderosa pine near the original infestation received a thorough examination. In the stand 8,430 clippings were removed from 289 large pines and examined for moth larvae. All buds on pines under 10 feet in height were examined. No shoot moth was found.

STATISTICAL DATA FOR SPOKANE VALLEY SURVEY

Total man-days	370
Trees examined	15,785
Number of suspected infested trees sampled	52
Number of infested trees confirmed	0
Individual properties checked	24,045
Business properties checked	994
Nurseries and sales outlets inspected	134
Pines examined at nurseries	6,760
Total cost of project	\$ 8,375.00

OREGON AND WASHINGTON DETECTION SURVEYS

U. S. Forest Service crews conducted surveys of selected communities in Washington and eastern Oregon during the summer of 1963. Objective of this survey was to detect any spread of the moth from the containment zone around Puget Sound and to determine the infested area within the containment zone.

Communities with populations over 1,000 were listed and placed in one of the following ten categories:

1. Communities outside the containment zone but within three miles of an area from which the moth has been eradicated.
Given highest priority and a 100 percent survey was made of all ornamental pines.
2. Communities outside of the containment zone but within 15 miles of an area from which the moth has been eradicated.
3. Communities outside the containment zone but within 25 miles of a known infestation of the moth.
4. Communities on main highways leading out from the containment zone, which were not surveyed in 1962.
Categories 2 through 4 were given second highest priority and all ornamental pines visible from the road were examined.
5. Communities on main highways leading out from the containment zone which were surveyed in 1962.

6. Communities not in the containment zone, which had never been surveyed.
7. Communities within 100 miles of a known infestation.
Categories 5 through 7 were surveyed but some of the larger towns received only partial coverage.
8. Communities over 100 miles from a known infestation.
In time available at the end of the survey, some residential areas of larger towns in category 8 were spot checked.
9. Communities within the containment zone that were not known to be infested.
Most communities in category 9 were spot checked during a survey for the rate of spread of the moth.
10. Communities within the containment zone known to be infested.
In some communities observations were made on the rate of development of the moth.

Forest Service crews examined 58,300 ornamental pines in 70 communities in Oregon and Washington, outside the containment zone, during 1963. Four 2-man crews spent 244 man-days, between June 24 and September 6, checking 11,902 pines at 67 sales outlets and 46,398 pines at residences and business establishments. Twenty-eight communities containing 20,854 pines were examined in Oregon and 37,446 pines in 42 communities in Washington.

Communities surveyed outside the containment zone in Washington and Oregon by Forest Service crews for European pine shoot moth during summer of 1963 were as follows:

Washington

<u>Community</u>	<u>No. Pines Examined</u>	<u>Community</u>	<u>No. Pines Examined</u>
Aberdeen	815	East Wenatchee	474
Camas	174	Ellensburg	1,012
Cashmere	199	Elma	171
Central Park	373	Fords Prairie	55
Centralia	616	Fort Lewis	639
Chehalis	533	Hoquiam	219
Chelan	149	Kelso	812
Cle Elum	78	Kennewick	910
Cosmopolis	43	Lacey	661

Washington (continued)

<u>Community</u>	<u>No. Pines Examined</u>	<u>Community</u>	<u>No. Pines Examined</u>
Lakes District	400	Raymond	652
Leavenworth	217	Republic	23
Longview	846	Richland	1,192
McCleary	75	Ritzville	108
Montesano	342	South Bend	147
Morton	59	Sunnyside	196
Okanogan	69	Tillicum	37
Olympia	1,608	Tonasket	111
Omak	242	Tumwater	112
Oroville	30	Vancouver	11,038
Pasco	1,276	Wenatchee	2,339
Pullman	2,509	Yakima	5,885

Oregon

<u>Community</u>	<u>No. Pines Examined</u>	<u>Community</u>	<u>No. Pines Examined</u>
Albany	543	Pendleton	903
Ashland	461	Prineville	134
Astoria	630	Rainier	24
Bend	1,018	Redmond	559
Clatskanie	22	Roseburg	411
Coos Bay	252	Salem	4,856
Corvallis	1,852	Scappoose	69
Eugene	5,760	Seaside	285
Grants Pass	207	Springfield	499
Hermiston	184	St. Helens	82
Holbrook	13	The Dalles	565
Hood River	361	Vernonia	24
Madras	41	Warren	200
Medford	855	Warrenton	44

Very intensive surveys were made in Aberdeen where two infested pines were destroyed in 1962 and in Raymond, Chehalis, and Salem where infested pines were destroyed in 1961.

Pines suspected of infection were examined in the field by a Forest Service entomologist or the damaged shoots were brought into Portland where the insects were reared and examined. No pines infested with the European pine shoot moth were found.

RATE OF SPREAD SURVEY

Mercer Island is located a mile east of Seattle in Lake Washington. Infestation was found in the Island in 1959, with indications that it was present two or three years earlier. During the summer of 1961 a Forest Service crew compiled a map showing all properties found infested with the shoot moth. No record was made of the species or number of infested pines on each property. A total of 17 infested properties was recorded on the north half of the Island.

In July, 1963, a two-man crew examined and mapped the location of the ornamental pines on the north end of the Island. All pines were plotted on a map to show; whether 2, 3 or 5 needled, old or current year's attack, or if uninfested. A total of 1,921 pines was examined and classified in a one and one-half square mile area at the north end of the Island. Large native pines were not examined or counted.

Two needle pines comprised 88 percent of the pines examined and 51 percent of these were infested by the moth prior to the 1963 moth flight. Nine percent were infested during the 1963 moth flight.

Three needle pines comprised only 5 percent of the pines in the survey area. Thirty-two percent of these were infested prior to the 1963 moth flight and 11 percent showed evidence of current year's attacks.

Seven percent of the pines were 5 needle and showed the lowest incidence of moth attack. Only one percent of these were newly attacked trees in 1963 while 15 percent were infested previously.

ORNAMENTAL PINE TREES EXAMINED FOR EUROPEAN PINE SHOOT MOTH AT NORTH END MERCER ISLAND, JULY 1963.

Type pine	No. examined	With old damage	With new damage	Not infested
2-needle	1,696	861	154	681
3-needle	88	28	10	50
5-needle	137	20	2	115
Total	1,921	909	166	846

CONTAINMENT ZONE SURVEY

The area adjacent to Puget Sound, where the shoot moth was either known or believed to be present, has been designated as a shoot moth containment zone. An effort has been made to prevent the spread of the moth

by halting all movement of pine stock out of this area. The containment zone consists of all of Whatcom, Skagit, Snohomish, King, San Juan, Island, Kitsap, and Mason Counties and parts of Clallam, Jefferson, Grays, Thurston, and Pierce Counties.

Forest Service crews spent 106 man-days on a survey within the limits of the containment zone. The survey was made during a period when the larvae were small and difficult to see. Also some of the moths were still flying, and all the eggs had not hatched. Crews spot checked each community by examining pines in the major residential areas. As soon as shoot moth larvae or typical moth damage was found the crew would move on to the next community. However, if no shoot moth was found the crews would move to the next town after 25 to 75 percent of the pines in the town had been checked. The smaller towns had a larger percentage of their pines examined. Many towns were small and contained few pines but others such as Bremerton and Mt. Vernon contained large numbers of pines and involved considerable survey time.

A total of 142 communities was surveyed. In 45 of the communities surveyed, the shoot moth or typical shoot moth damage was found. Limited coverage of 97 other communities revealed no moths or moth damage.

Communities within the containment zone found infested with European pine shoot moth during the 1963 survey were as follows:

Bellingham	Kent	Rosedale
Blaine	Lake Forest Park	Seahurst
Bryn Mawr	Lynden	Seattle
Burlington	Maury Island Golf Course	Sheridan
Cedarhurst	Mercer Island	Sunnydale
Cromwell	Normandy Park	Tacoma
Duwamish	North City	The Highlands
Eastgate	North Puyallup	Tukwila
Everett	Puyallup	Vashon Heights
Fife	Redmond	Waterman
Foster	Richmond Highlands	White Center
Gig Harbor	Riverton	Wollochet
Kenmore	Riverton Heights	Woodway
Kennydale	Ronald	Zenith

Communities within the containment zone where European pine shoot moth was not found during a partial survey 1963.

Adelaide	Bangor	Chico
Alderwood Manor	Berrydale	Coal Creek
Algona	Bremerton	Coalfield
Anacortes	Buckley	Cove
Arletta	Burton	Covington
Arlington	Campton	Creosote
Avondale	Cedar Mt.	Dieringer

Communities within the containment zone where European pine shoot moth was not found during a partial survey 1963 (Continued)

Dockton	Luen Beach	Rollingbay
East Redmond	Magnolia Beach	Sappho
Echo Lake	Manchester	Seabold
Edgewood Park	Manitou Beach	Sedro Woolley
Elliott	Manzanita	Shawnee
Ellisport	Maplewood	Silverdale
Enumclaw	Milton	South Beach
Ferncliff	Mirror Lake	Snohomish
Ferndale	Monroe	Snoqualmie
Fletcher Bay	Monte Vista	Snoqualmie Falls
Flint	Mount Vernon	South Gate
Forks	Newcastle	Steilacoom
Hollywood	North Bend	Suquamish
Indianola	Oak Harbor	Tahlequah
Issaquah	Pacific	Tyee Park
Joyce	Poulsbo	Vashon
Kingston	Pinehurst	Vashon Center
Lakota	Pleasant Beach	Venice
Lake City	Portage	Vinland
Lake Stevens	Port Angeles	Warren
Lakewood	Port Blakely	Webb Center
La View	Port Madison	Winslow
Lynwood	Port Townsend	Woodbury
Lisabeula	Redondo	Woodinville
Louise Lake	Renton	Woodmont Beach
Lowell	Retsil	

Mugho pines recently planted at a school in Burlington were found to be infested and one infested pine was located at Waterman across the inlet from Bremerton. Of interest was discovery of the moth at three locations on Vashon Island and the spread across the Puget Sound Narrows to five locations in western Pierce County. Moth damage was found at Blaine and Lynden near the Canadian border but it is not positive that this damage was caused by the European pine shoot moth. Further surveys will be required in these two towns in early spring when the damage and larvae are more evident.

Spread of the moth from community to community within the containment zone has been slow and in most cases has occurred through the movement of infested pine stock. Spread within infested communities has been rapid. Moth flights from infested to adjacent pines is mainly responsible for this local spread.

Coverage of communities during this survey cannot be considered complete but it does give a good indication of how the moth is spreading within the containment zone.

